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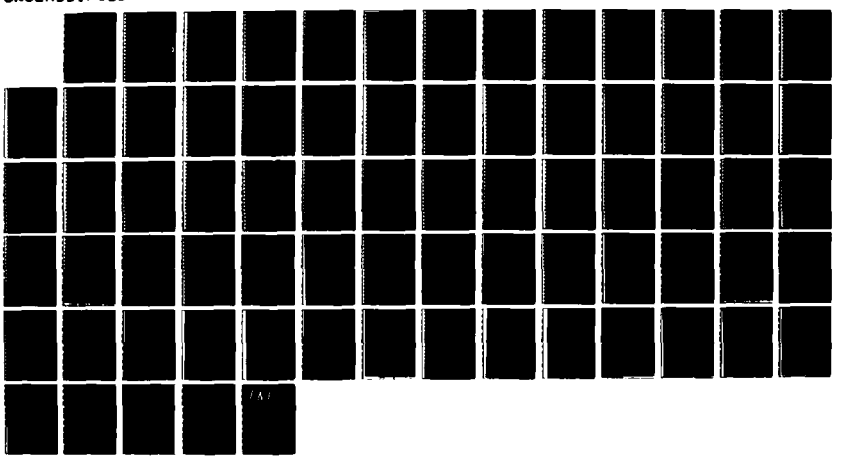

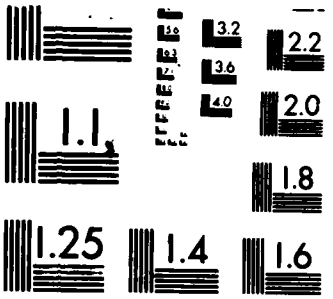

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# PHASE II VERIFICATION REPORT OF VAMOSC SOURCE DATA SYSTEM H036B

Contract No. F33600-84-C-0465

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## 1.0 INTRODUCTION

The Office of VAMOSC, AFLC/MML (VAMOSC) has initiated a verification and validation plan for the Visibility and Management of Operating and Support Costs (VAMOSC) system. The first major phase of the validation effort was directed towards validation of accuracy and appropriateness of the algorithms of VAMOSC which develop costs for major weapon systems and components. This phase is nearing completion; corrections or improvements in the algorithms have been defined. The second phase of the validation effort is to examine data source input to the algorithms for accuracy, completeness, and appropriateness. The first source data system selected by the Air Force for phase two validation analysis is the "Depot Maintenance Industrial Fund Cost Accounting Production Report (HO36B). It is a primary data system for supplying depot maintenance cost to VAMOSC. Information Spectrum, Inc. under contract F33600-84-C-0465 was required to analyze HO36B as an input source to VAMOSC. This report presents the results of the analysis.

The Statement of Work requires:

(a) Conducting an analysis of the HO36B data system, its input data sources, and its interfaces with the VAMOSC system to establish the validity and accuracy of HO36B input data as they relate to VAMOSC.

(b) Conducting an analysis of current operations of HO36B feeder data systems at the Air Logistics Centers (ALCs) with emphasis on the integrity of the definition of data elements as

the data elements are generated at the ALCs and reported through HO36B.

(c) Providing a final report which includes shortcomings in HO36B data and/or processing, modifications required in HO36B input data, and modifications required in VAMOSC data element definitions.

## 1.1 Background

HØ36B is a system which collects and reports actual expenditures of depot maintenance funds for maintenance and modification of aircraft, aircraft engines and aircraft components. It provides similar costs for Communications- Electronics (C-E) equipment. Implementation of HO36B stems from a requirement levied by the Office of the Secretary of Defense (OSD) to aggregate depot maintenance costs in compliance with DoD Handbook 7220.29H. HO36B provides cost and other information for work accomplished at the five Air Logistics Centers (ALCs) and the Aerospace Guidance and Meteorology Center (AGMC). These activities include:

Warner Robins ALC
San Antonio ALC
Oklahoma City ALC
Sacramento ALC
Ogden ALC
Newark AGMC

HO36B collects completed depot maintenance costs by aircraft Model/Design/Series (MDS) as they undergo Programmed Depot Maintenance (PDM), by aircraft engine Type/Model/Series (TMS), by C-E end item National Stock Number (NSN) and by repairable

components for aircraft, aircraft engines, and C-E components by NSN.

Costs are compiled annually by H036B for aircraft and are used by the Weapon Systems Support Costs (WSSC) system of VAMOSC. Costs are compiled quarterly for aircraft components and are used by the Component Support Cost System (CSCS) of VAMOSC. Additionally, costs are compiled annually for C-E completed end items and individual recoverable components by the C-E system of VAMOSC.

The VAMOSC systems WSSC, CSCS, and C-E use the H036B system data in the following manner:

a. The total costs and number of aircraft completing PDM are recorded for use by WSSC and CSCS.

b. The cost (from H036B) and number of engines completing depot overhaul are recorded and are used to develop an average cost to repair for the reporting period (annually for WSSC and quarterly for CSCS). The cost per engine repair is then applied to the number of engines sent to the depot by the operating bases. The computation is accomplished in this manner because the engines are identified to the MDS at the base level. This enables the depot costs to be ascribed to the proper aircraft. Therefore, allocation is not necessary for those cases where more than one aircraft uses the same engine.

c. The total costs for depot repair of completed C-E end items (from H036B) are compiled for the reporting period (annually) and are displayed by TMS on the VAMOSC C-E report.

d. The costs and numbers of stock numbered repairable items that complete maintenance during the reporting period (annually for WSSC and quarterly for CSCS) are used to compute an average cost to repair an item for the reporting period. The average cost of repair per item is then applied to the number of the items that were reported Not Repairable This Station (NRTS'd) from an operating base. This computation requires two elements. It uses depot activity to establish the latest cost to repair an item and uses the actual failure rate from the aircraft identified by MDS, to establish the number of items generated by the base level for depot repair. To capture the cost at time of failure it is assumed that all items that failed will be repaired at the time of failure.

Depot repair of NSN items does not always take place immediately, but the assumption that it does permits the establishment of a cost per NSN that is related to the frequency of failure and not the frequency of depot repair. Thus, the H036B system data is used in VAMOSC to develop actual cost to repair (annually for WSSC and quarterly for CSCS) for each NSN. From the above computation, it can be seen that a correct production count of engines or aircraft/engine component items is equally as important as cost. This will be addressed later in the report.

Depot costs for recoverable components of C-E equipment are also obtained by NSN from HO36B. In the VAMOSC system these NSN costs are allocated to the proper end item (TMS) by an allocation factor because the quantity per application of these NSNs are often different for each TMS end item.

## 1.2 Verification Methodology

Verification of the HO36B system commenced with a review and analysis of technical documentation for HO36B and the immediate feeder system input to the HO36B system by the various ALCs. The total depot maintenance process and its complexities were also examined including the HO36B interface with the VAMOSC subsystems. In particular, the display of HO36B information in VAMOSC output reports was identified. Preliminary diagrams of HO36B feeder systems data flow were drawn through HO36B processing, culminating in VAMOSC output reports. These diagrams provided an investigative framework to guide the subsequent analyses. The results of this preliminary analysis and review revealed the need to track all HO36B cost elements for aircraft, engines, C-E end items and components for these items from source data feeder systems through VAMOSC processing. To keep the magnitude of this effort within bounds, two ALCs were selected for visits that provided the best expectations of identifying items on a selected basis that would provide the data for tracking. The ALCs selected were Oklahoma City-ALC (OC-ALC) and Sacramento-ALC (SM-ALC). OC-ALC provided the potential for selecting specific aircraft engines and their components. SM-ALC provided the same

opportunity (except for engine repair) as OC-ALC, but in addition was the primary source of depot repair for C-E equipment. Thus, all required items to be tracked, i.e, aircraft rework, engine rework, aircraft/engine component rework, C-E end item repair, and C-E component rework were included in the maintenance activity of these two depots.

Discussions with Air Force personnel during visits to these ALCs assisted in selecting representative data which could be used for tracking to verify HO36B and its feeder systems. Visits also revealed the qualitative nature, type of editing and verification performed at AFLC and the ALCs to maintain accuracy of the data. These visits were followed by telephone calls confirming interpretation of data, data definitions, data flow, verification methods and processing procedures.

The decision to track all cost elements from the HO36B feeder systems through VAMOSC processing presented two issues that had to be resolved. First, because of the hierarchical structure and multiplicity of feeder system sources for the numerous HO36B cost elements (see Figure 1.2-1), it is infeasible to track cost elements from the point of induction at the depot through the production chain to VAMOSC. Thus, a choice had to be made as to what point to begin the data tracking. Secondly, tracking of the numerous HO36B system cost elements through the VAMOSC algorithms can become extremely complex. Many input cost elements lose their identity when combined or accumulated with

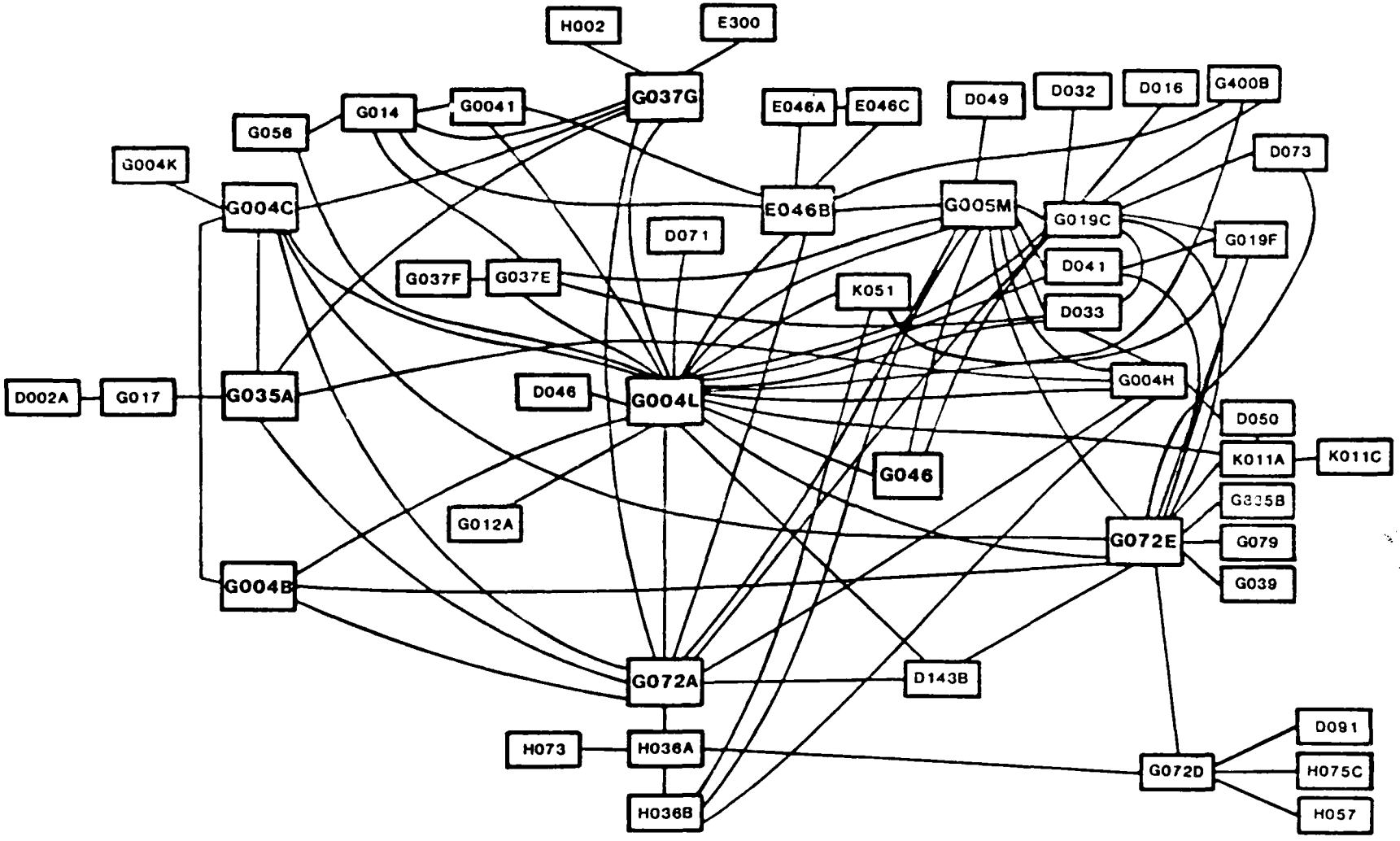



Figure 1.2-1 Depot Maintenance Systems Interface

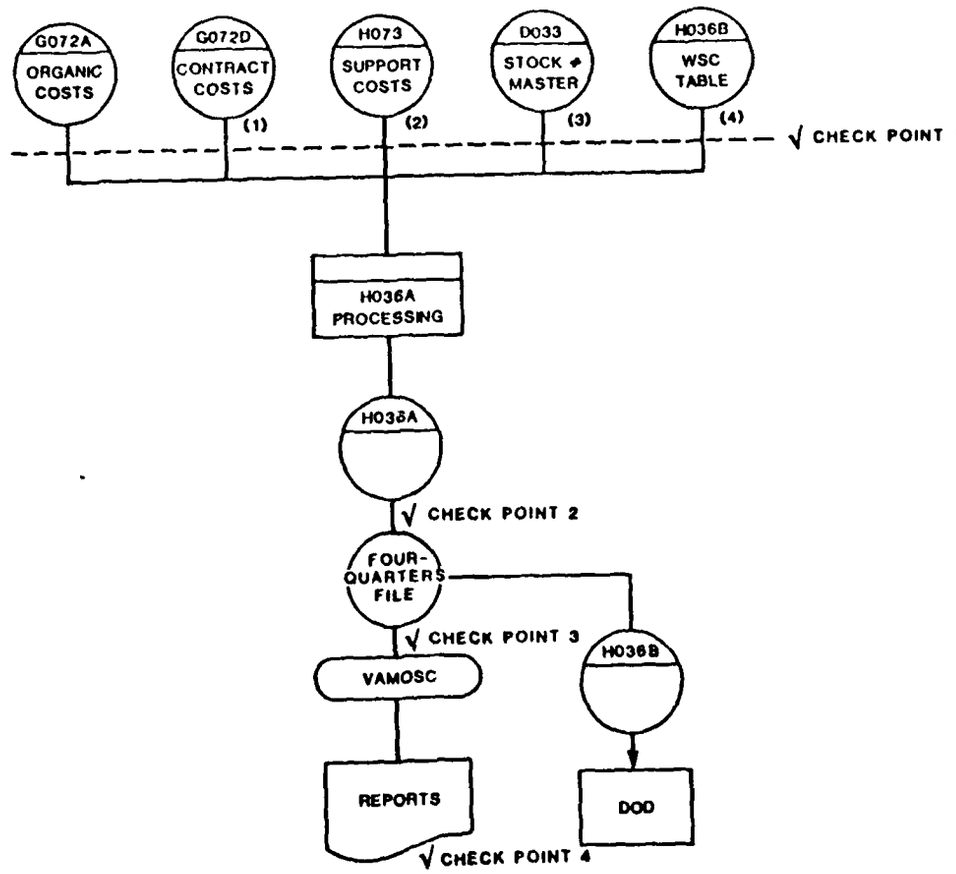
other input cost elements in the algorithms which produce the output cost elements in the VAMOSC reports.

To address the first issue, tracking began with the automated files at the ALCs, namely G072A (organic costs), G072D (contract costs), H073 (organic maintenance support costs) and D033 (stock issue price). These inputs are shown in Table 1. Table 1 also also shows the information flow and structure for the tracking process. These automated files were selected to commence tracking since they provide the first major consolidation of depot maintenance organic costs, contract costs, and support costs for weapon system end items and components respectively at the ALCs. This selected point of origin also reflected a decision to limit the complexities of the task to resources available and at the same time provide a comprehensive demonstration of the integrity of the data flow. This practical decision is supported by the fact that the feeder systems tend to be self correcting in nature since they have immediate feedback and physical visibility in their production environment.

The H036B file shown as an input in Table 1 is a recycled file from a previous period's processing. It is used only to provide a table of current Weapon System Codes (WSC) for editing input records. Each quarter the automated files of each of these depot system (G072A, G072B, H073) are consolidated at each ALC into an H036A system file and forwarded to AFLC. At AFLC the H036A data from each depot are aggregated into a collective file for each quarter. This information is maintained on a file that

Table 1

Check Points for Tracking H036B
and Feeder System Data



contains the latest four quarters information from the ALCs. When a new quarter is added the oldest quarter is dropped from the file. This aggregate file for the four quarters is called the Four-Quarters file and at the end of a fiscal year provides the annual input required for WSSC and C-E. Each quarter's information is processed as it is generated to produce the quarterly CSCS report. The Four-Quarters file is also used to supply depot costs to produce the annual H036B file supplied to DoD in conformance with DOD Handbook 7220.29H. Further details pertaining to the tracking process is provided in Section 2.

To address the second issue of tracking the numerous H036B input cost elements (see Attachment C) through the VAMOSC algorithms to the output cost elements of the VAMOSC reports, the following procedure was employed.

Selected VAMOSC output data cost elements were identified from CSCS and C-E reports that could be manually computed from input cost elements of the Four-Quarters file. This manual computation was performed and compared with the VAMOSC CSCS and C-E system output report data. Comparisons were not made for WSSC output cost elements since this was not a requirement of this study. This is indicated by the dotted area in Figure 2.1-1. However, all H036B input cost elements for the selected items that were germane to WSSC cost elements were tracked up to the point at which WSSC algorithms process the data to produce WSSC output elements. Figure 2.1-1 illustrates the overall H036B data flow from the ALCs to each of the VAMOSC systems. As such,

this figure provided the framework for the procedures used in this analysis. This figure, as well as other figures in this analysis, were reviewed with AFLC personnel for accuracy.

## 2.0 H036B COST ELEMENT VERIFICATION PROCEDURES

### 2.1 Information Flow

The origination of H036B information from the five ALCs and the Newark AGMC and the flow of information through AFLC processing including VAMOSC is illustrated in the diagrams of Figures 2.1-1 through 2.1-5. These diagrams should be referred to for the ensuing description of H036B information flow.

Each FY quarter, as indicated in Figure 2.1-1, depot cost data are assembled by the five ALCs and Newark AGMC and submitted to AFLC. The H036A data from the ALCs and G326 (containing specialized equipment depot data) from Newark AGMC are in the same format required for the annual H036B data file, but the data represent only one quarter's information for each data submission. This information is consolidated at HQ AFLC on the Four-Quarters file (tape) which retains the H036A and G326 information for the latest four quarters, identifying the data by end item, component, activity, and fiscal year quarter. This file is the major interface supplying depot maintenance data to the VAMOSC subsystems. Each quarter this information is provided as input to the CSCS of VAMOSC for quarterly report production. At the end of each fiscal year, a full year of information is provided to the C-E and WSSC systems of VAMOSC for annual report production.

The Four-Quarters file information is reformatted annually for generation of the "Department of Defense Depot Maintenance

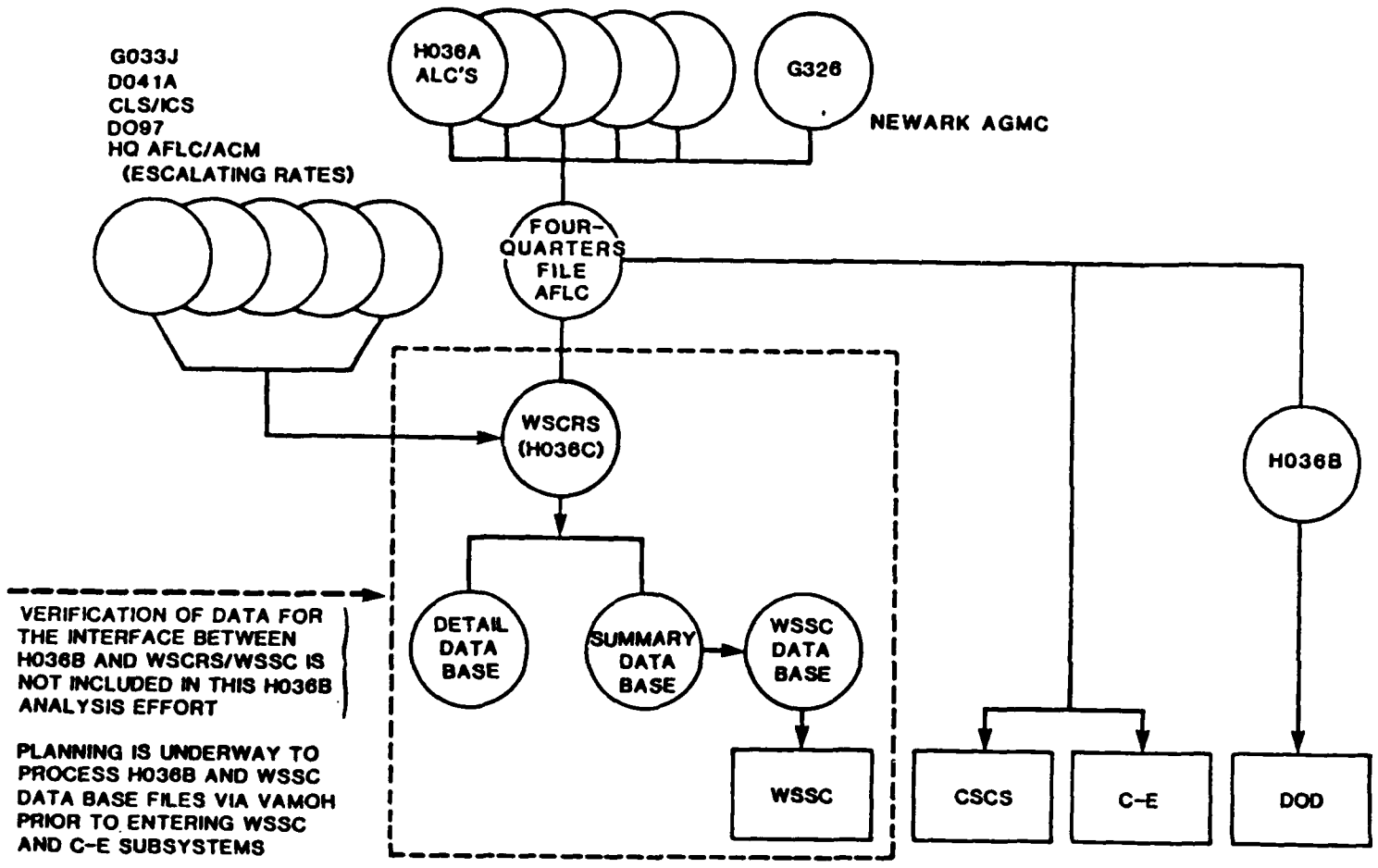



Figure 2.1-1 Data Flow for Verification of HO36B Data

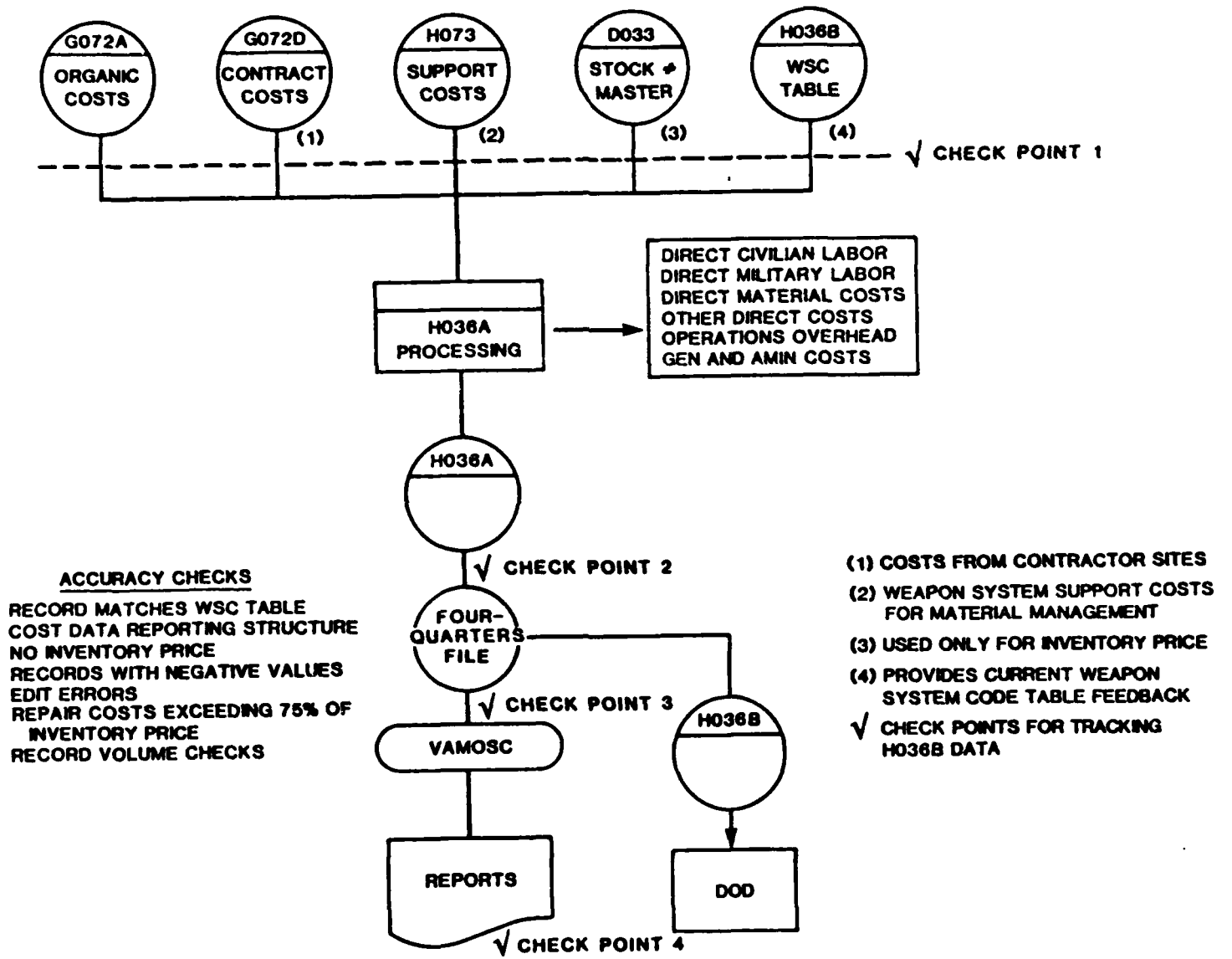



Figure 2.1-2 H036A Feeder System Input at Each ALC

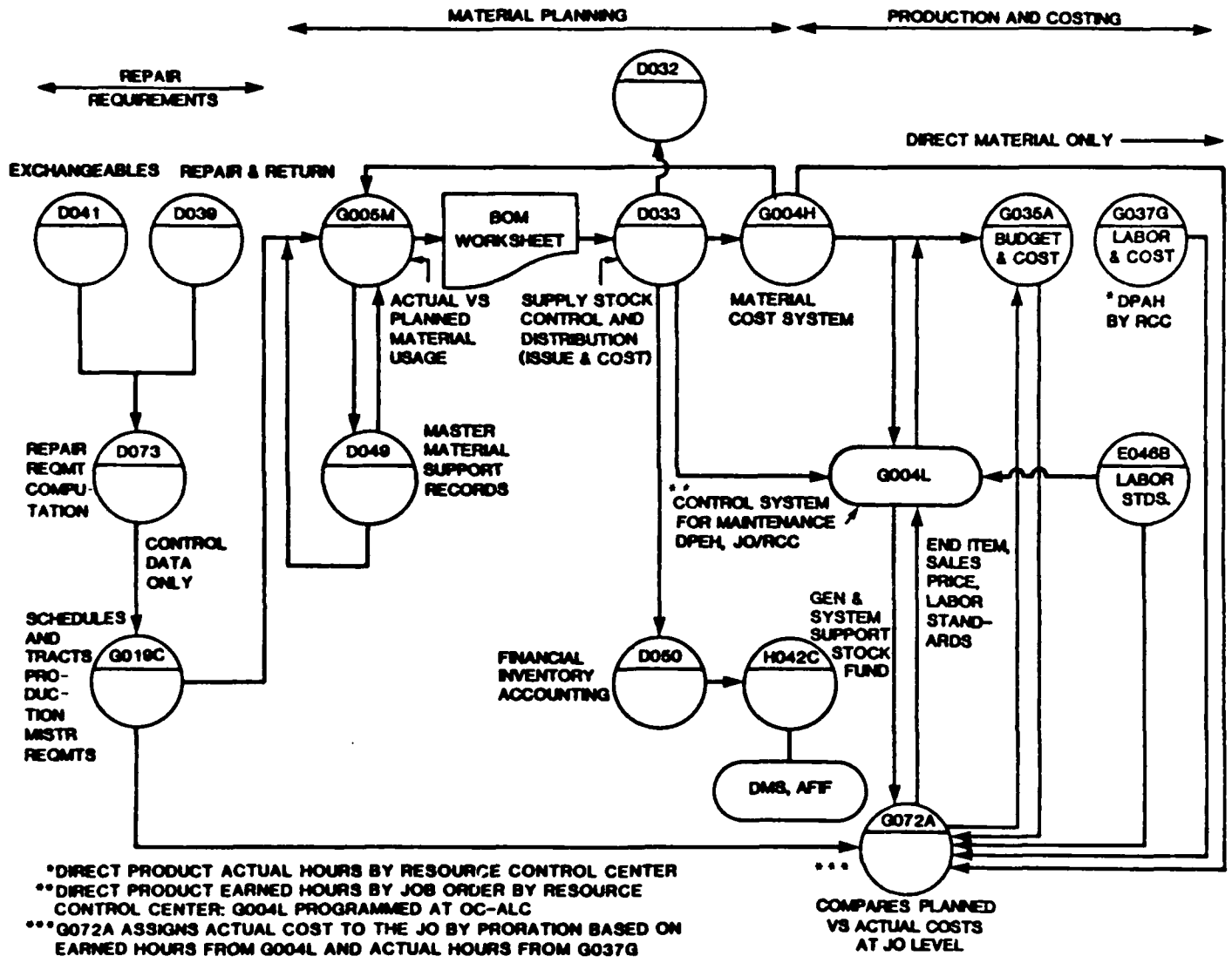



Figure 2.1-3 G072A Feeder System Input at Each ALC

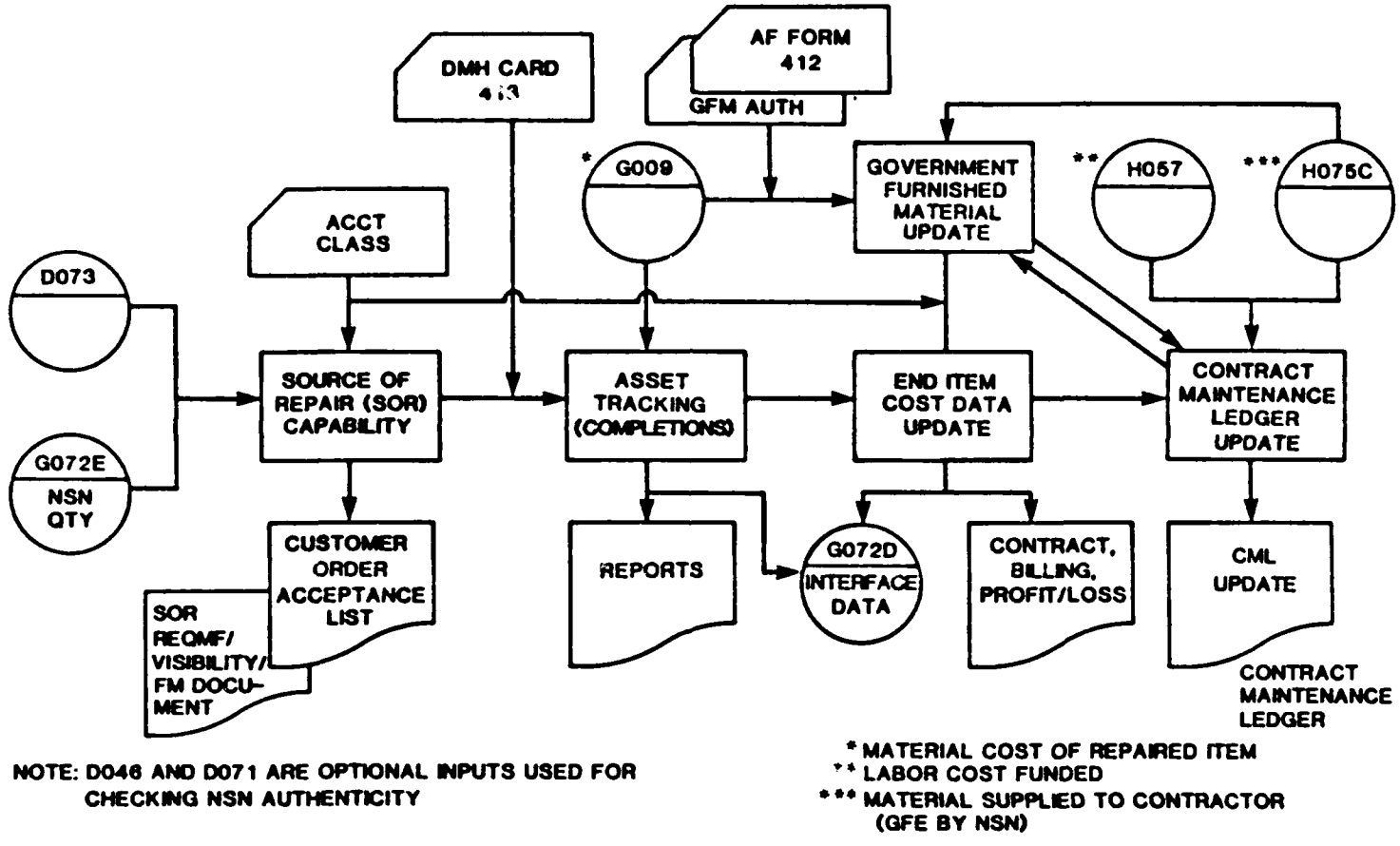



Figure 2.1-4 G072D Feeder System Input at Each ALC

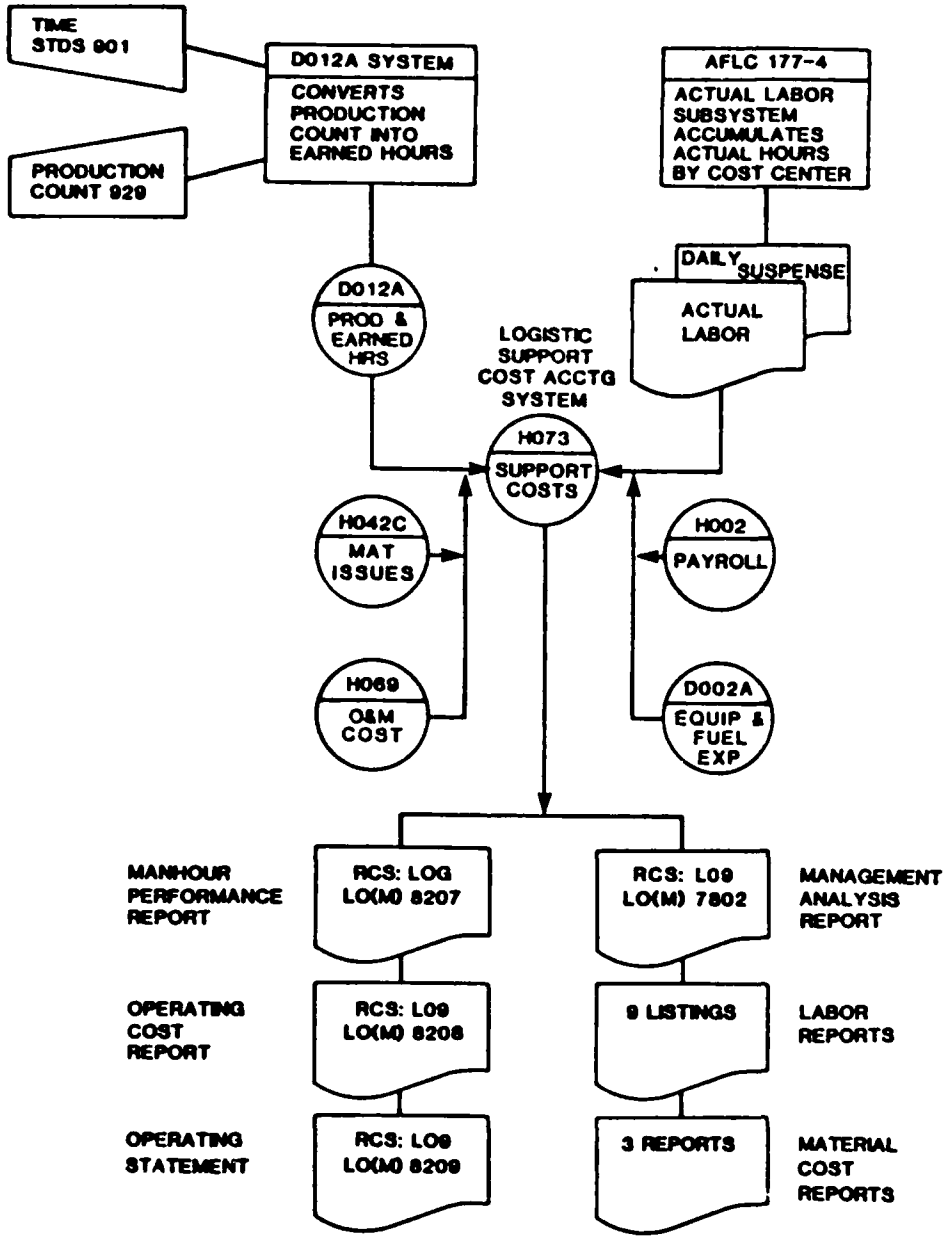



Figure 2.1-5 HO73 Feeder System Input at Each ALC

Industrial Fund Cost Accounting/Production Report" (H036B). This report satisfies the report requirement of DoD Handbook 7220.29H.

Figure 2.1-2 shows the five automated depot cost input data systems to each ALC's H036A system, data flow to the Four-Quarters file, to VAMOSC and to DoD reporting as previously Mentioned in Section 1.2 .

Figure 2.1-3 is an over-simplified flow chart of the many manual and automated systems leading to the composition of one of the five major inputs to the H036A system, i.e., G072A (organic depot costs). Similarly, G072D and H073 have a complex composition of input systems as indicated in Figures 2.1-4 and 2.1-5. These figures illustrate in more detail the rationale for selecting G072A, G072D, and H073 as the source data points for tracking H036B cost elements.

Since D033 supplies only the stock issue price of an NSN, detailed flow charts of its composition are not illustrated. Additionally, selected items for tracking for this analysis did not include specialized items repaired by Newark AGMC, so a detailed flow chart of G326 data is not provided.

## 2.2 Verification Check Points

Four verification check points in the processing of H036B data were chosen to evaluate data accuracy and completeness. Selected data at each of the check points were verified to assure that data were not altered or lost. The check points are indicated in Figure 2.1-2 as follows:

Check Point 1. Selected data originating from G072A, G072D, H073 and D033 at each of the ALCs.

Check Point 2. Selected data produced by H036A at each of the ALCs and sent quarterly to the Four-Quarters file at HQ AFLC.

Check Point 3. Selected data from the Four-Quarters file and used as direct input to VAMOSC.

Check Point 4. Selected data displayed in VAMOSC output reports.

Reference will be made to these check points during discussion of H036B real data tracking in the following report sections.

## 2.3 Data Selected for Verification

Basic source data for this study were selected from Oklahoma City ALC and Sacramento ALC since these activities repair aircraft and components which are unique to their respective activity. OC-ALC was selected as a source for engine costs and SM-ALC was selected because most of the depot repair of C-E equipment is accomplished there. Both OC-ALC and SM-ALC accomplish aircraft PDM for certain aircraft to the exclusion of other ALCs and accomplish repair of unique repairables by stock number. Selection of information on unique items from these two activities reduced the data collection and processing workload required by this analysis. Fourth quarter FY 84 cost data were used for analysis up to the point of checking the VAMOSC output reports since these data are the latest available.

"FY 84 VAMOSC OUTPUT REPORTS WERE NOT YET PROCESSED SO THE TRACKING EFFORT COULD NOT BE CARRIED THROUGH THE FY 84 OUTPUT REPORTS. THEREFORE, FY 83 VAMOSC REPORT DATA WERE USED FOR THE FINAL CHECK POINT AND WERE COMPARED WITH FY 83 FOUR-QUARTERS FILE COST DATA. FY 83 YEAR END DATA WERE USED FOR C-E AND FY 83 FOURTH QUARTER DATA WERE USED FOR CSCS."

Depot cost data from the A-10, F-111 and the E-3A aircraft were utilized. These aircraft were selected because they represented aircraft where OC-ALC or SM-ALC only performed depot maintenance. Components from these aircraft were selected also which only those depots repaired. Specifically, the selected components met the following criteria:

(1) They were maintained by organic or contractor facilities.

(2) They were expected to have significant repair activity in any quarter.

(3) Only one depot activity was responsible for repair.

(4) Their costs would be measurable in VAMOSC output reports.

A listing of selected items is provided in Attachment D.

## 2.4 Reviews Conducted at ALCs

During the visits to OC-ALC and SM-ALC an analysis of the current operations of H036B feeder data systems was conducted

with emphasis on the definition of data elements as they apply to VAMOSC.

Selected items for detailed data tracking were identified in accordance with the criteria in paragraph 2.3. The E-3A aircraft was recommended as the most appropriate aircraft for tracking by depot analysts at OC-ALC. The J-57-21B, J-57-43WB, TF-30-7, TF-30-100, and the J-33-35 engines were also selected for tracking. Additionally, production personnel identified repairable items for end items that were known to be repaired only by OC-ALC in the fourth quarter FY 84. The F-111 and A-10A aircraft were identified as the most appropriate aircraft for data tracking by SM-ALC production personnel. These production personnel also identified repairable items by stock number for each of these aircraft that were known to be repaired only by SM-ALC in the fourth quarter FY 84. The C-E Item Manager at SM-ALC identified both C-E end items and components by NSN for which depot activity occurred during the fourth quarter FY 84.

During these visits the ALC current processing procedures for H036B cost elements were reviewed. The definition of special codes used by the ALCs to record H036B cost elements was discussed. Local reports and procedures used in verifying system data were identified. Sample copies of these local reports were obtained and arrangements were made to receive the version of these reports that provided fourth quarter fiscal year data. The local OPR for D072A, D072D, H073 and H036A was contacted at each

ALC. These individuals reviewed and confirmed system processing diagrams developed by ISI.

One of the specific procedures examined at the ALCs was the reporting of Mobile Depot Maintenance (MDM) team costs since in early analysis of the documentation there appeared to be an overlap in the reporting of costs by two input systems. In particular, AF Regulation 400-31 Vol III, 12 Aug 82 provides a procedural guide for the user to obtain O&S costs for ground C-E equipment utilizing the C-E Subsystem of the VAMOSC program. Paragraph 5-12 of that document discusses direct and indirect costs which are incurred at the ALC and by MDM teams to service an end item and its recoverable components. MDM team costs are reported to the home ALC of the MDM team on AFLC Form 206 (identified by Program Control Number (PCN), End Item, and Job Order Number). These forms are the source for MDM cost input to the H036B system. H036B then reports these costs to VAMOSC. Paragraph 5-12 of AFR 400-31, Vol III also describes the MDM team costs being reported to VAMOSC via the C0003K system by Standard Reporting Designator (SRD). It is unclear whether these two reporting systems are mutually exclusive for certain C-E items, or whether there may be a double accounting for the MDM team costs. This area should be further investigated for possible reporting errors by the OOV.

Discussions with personnel at OC-ALC and SM-ALC revealed the following accuracy and verification checks performed during the progressive preparation of H036B system data.

a. Editing checks were noted within the automated processing of H036B feeder system data. Each quarter an Edit Review List is prepared to enable personnel to make cost corrections, Report Number A-H036A-ARD-Q1-MQ1.

b. Record counts are routinely provided for every system input as it proceeds through each processing cycle to assure that records are not lost or added. Totals of funded and unfunded costs are also recorded for a file in each processing cycle to assure that no costs have been lost.

c. Internal processing checks are performed to verify the data. For example, each record is checked against an approved Weapon System Code (WSC) table to assure that only existing weapon systems are reported.

d. Each quarter at the ALCs, H036A data (organic and contract maintenance support costs) are reconciled with general ledger accounts. A report is produced entitled "Quarterly Reconciliation Report H036A-BFC-Q3-MQ3 which accomplishes this.

e. Records which contain negative costs are reviewed quarterly. A Negative Value Review List is provided for this (Report Number A-H036A-ARC-Q1-MQ1).

f. GØ72D input data at OC-ALC are prepared daily and are checked against a weekly run followed by checks against a monthly run.

g. At OC-ALC, quarterly G072A cost totals are compared with data in the H036A output to assure that all data from G072A have been entered and are accurately recorded in H036A within $\pm$2%.

h. Lastly, the H036B data review at the ALCs revealed that Interim Contract Support (ICS) costs are still being expended for the E-3A aircraft at OC-ALC. These costs are not reported in H036B since they are considered to be development costs and not O&S costs. However, the E-3A is in an operational phase and should be updated as O&S costs. Additionally, depot costs for Air Force Reserve and National Guard aircraft are collected by H036B but are not presently reported in VAMOSC. If a decision is made to include these aircraft in VAMOSC, H036B can serve as an appropriate data source for depot cost information.

## 3.0 DATA ANALYSIS

### 3.1 Check Point 1 - Data originating from G072A, G072D, H073 and D033

Depot maintenance cost data for check point 1 were provided from OC-ALC and SM-ALC fourth quarter FY 84 G072A, G072D, and H073 computer files. These data were used as the baseline or reference point from which input cost elements were tracked. Therefore, no comparisons were made with this data until check point 2 was initiated as described below. D033 supplied only the stock issue price for NSN items and for this reason was not tracked through the processing check points to the level of detail of the other cost elements.

Maintenance support cost data provided by H073 were not available for aircraft at the MDS level or for components at the NSN level. These data were available only at the MD level and Stock Class level respectively. As a result, H073 support costs were tracked through the check points at this summary level of detail. However, this did not affect the accuracy of the H073 data. The H073 summary level costs are distributed to the MDS in later VAMOSC processing.

A listing of the input cost elements which were tracked for each selected equipment item through each of the checkpoints is provided in Attachments E, F, and G.

3.2 Check Point 2 - Data Produced by H036A at the ALCs.

The cost elements comprising the H036A file are listed in Attachment C.

Check Point 1 costs from the individual systems (G072A, G072D, H073) were compared with cost elements of H036A in check point 2 and the results are as follows:

a. All of the G072A organic cost element data from OC-ALC and SM-ALC correlated with the corresponding cost element data of H036A.

b. One cost element entry for Government Furnished Material (GFM) Expense for Work Performance Category (WPC)=Q (Technical Support) was missing from the G072D contract file for the E-3 aircraft at OC-ALC, but was present on the H036A file. This cost amounted to $227,000. It is possible that a card input (which is permissible) was used to enter the $227,000 GFM cost in H036A. The cost would, therefore, not have appeared on the G072D file. A similar situation was noted for the F-111E aircraft at SM-ALC. A cost element entry for Government-Furnished Services (GFS) Funded for WPC = B (Progressive Maintenance) was missing from the G072D contract file but was present on the H036A file. This procedure of introducing costs into the final processing by card input breaks the data audit trail between the input sources and the H036A file. This process should be reviewed by the AFLC H036B OPR and a procedure established to maintain the audit trail of the data.

c. All records on the H073 maintenance support cost file from OC-ALC and SM-ALC representing WPC=P (Planning Support), Q (Technical Support) and R (Engineering Data) for aircraft checked identically with H036A file data.

d. A printing error was found in a standard ALC output report of H036A file data. This error resulted in the fourth line of the four line item printout appearing on the fourth line of the following item record printout. This error was reported to HQ AFLC for correction. The error does not affect the cost data of the H036A file itself. However, it could cause a misinterpretation of cost information since the data printed on the output report are out of sequence.

3.3 Check Point 3 - Data Produced by the Four-Quarters File

At this check point all the cost element data for H036A from each of the ALCs were compared to the Four-Quarters File at AFLC. H036A data for the fourth quarter FY 84 were obtained individually from the two ALCs. H036A data checked out with the Four-Quarters file. However, the following discrepancies were found which should be investigated. In particular, the high production count of some of the aircraft and engines as end items became conspicuous and is indicated in paragraphs a and b below.

a. The "Total Production Quantity Completed" cost element for the F-111D, F-111F, and A-10A aircraft on the H036A file from SM-ALC, for WPC code = N (Technical Assistance), was significantly high. The F111D had two records with production counts of 2474 and 8099. The F-111F had two records with production counts

of 1104 and 10,360. The A-10A had two records with production counts of 5501 and 5504. This appears to indicate that Mobile Depot Maintenance Teams and other depot personnel providing technical assistance are generating production counts that are not meaningful. These corresponding production counts are not reported on the Four-Quarters file, because the information is not required for technical assistance costs by OSD. The production counts also do not affect VAMOSC since costs at the aircraft level are the total costs per aircraft MDS and production counts are not germane.

b. The "Total Production Quantity Completed" data element for the J33-35 engine overhaul for 4th Quarter FY 84 had high production counts on the Four-Quarters file (7200 items completed). This quantity exceeds the total inventory of the J33-35 engine (approximately 350). OC-ALC (MMMMD) was contacted in this regard and he stated that hours of work performed by field teams were reported on engine overhaul work vice engine production counts. It was also noted that the "Production Count" data element of the EF-111A aircraft for analytical rework for 4th quarter FY 84 had extremely high values (360 completed) for an inventory of 60-65 aircraft. These figures indicate that the depot procedure for reporting production counts of major end items (engine or aircraft) requires review. No anomalies were found in individual NSNs, however, for "Production Count".

c. The "Average Cost of Repair" reported by Owner/Operator Code 3 (Contractor Work) on the H036A file from SM-ALC was

computed erroneously. A manual computation determined that it was low by a factor of ten. This appears to be a programming error caused by a misplaced decimal. However, this computation from the HO36A file is not used in VAMOSC reporting since the Average Cost of Repair is computed separately in VAMOSC processing. This circumstance was reported to the HO36B OPR at AFLC.

d. After the annual/quarterly processing of HO36B data is completed there are occasions where records exist that contain negative values in the cost fields. These negative cost records represent transactions for which a credit or adjustment is made to a job order which is no longer open, i.e. the transaction had been reported as closed/completed in previous reporting periods. Negative costs can originate, for example, when job orders are closed and material is returned in a month following closeout of the Job Order or returned in a following fiscal year. An error in reported labor can also generate a negative cost. Efforts are made at the ALCs to adjust these negative costs but it is not always possible to accomplish this in the current reporting period because the record to which it pertains does not exist - i.e. it was completed in a previous reporting period. The negative costs are not reported in the annual HO36B report to OASD. Since only selected data were used to verify HO36B system processing under this study, no estimate can be made as to the

effect this elimination of negative costs has on final reported costs to DOD. However, the particular data selected did show negligible negative costs.

A procedure can be suggested that would enable the negative costs to be reflected in the historical records of these data. The reporting requirements by DoD Handbook 7220.29H requires the services to maintain each reporting years data for ten years. The negative cost records can be passed against previous year reporting data (normally no more than two years) to try and find a match and cost adjustments (negative costs) made if a match is found. If no match is found, the costs may then be discarded. The suggested procedure would update the historical data base so that future manipulations of the 10 year data base would be as accurate as possible. This procedure may not be cost effective for minor cost adjustments since the cost of processing may be more than the adjustments are worth. This judgement must be made each year. If this procedure is instituted, the negative costs for which a match has been found in previous years data may also be reported to OSD so they may correct their own records. This will keep both bodies of historical data synchronized.

### 3.4 Check Point 4 - Selected Major Cost Element Output From VAMOSC Reports

At check Point 4, depot maintenance cost elements for selected aircraft and NSNs from the Four-Quarters file were compared with corresponding cost elements from the VAMOSC reports. Year end FY 83 data were utilized for C-E equipment

items and 4th Quarter FY 83 data were utilized for CSCS items. The results of this effort are described separately below for C-E and CSCS.

3.4.1 C-E End Item Cost Comparisons.

In the C-E VAMOSC report, depot maintenance cost is computed for a C-E end item or repairable subassembly of the end item by NSN. The depot maintenance cost is an accumulation of several costs such as civilian and military labor cost, direct material cost, contract maintenance cost, and general and administrative cost, described in Paragraph 5-12 AF Regulation 400-31 Vol III 12 Aug 82. If a C-E end item (TMS) has more than one subassembly, a portion of this total cost for each subassembly must be allocated to the TMS (since the component may go on more than one TMS). This allocation is accomplished by using a computed Recoverable Allocation Factor. Additionally, the allocated costs for all subassemblies belonging to a TMS must be accumulated. Mobile depot team costs must also be added to the particular TMS being costed. Checking of this automated computation requires several input systems and a lengthy manual computation.

In order to make this manual computation feasible, a few TMS end items for this check point were selected which had only a few subassemblies. Table 2 shows a listing of the selected TMSs and their subassemblies together with a comparison of depot maintenance costs from the Four-Quarters file, Depot Maintenance Costs report, and the VAMOSC report using the Recoverable Allocation Factor. All the comparative costs and the Recoverable

TABLE 2

Comparison of Four-Quarters File and VAMOSC
FY 83 C-E Equipment (FY 83 Year End Costs)

| TMS | TMS NSN | Component NSN | Four Quarters Depot Maintenance Funded & Unfunded Cost | VAMOSC Depot Maintenance Funded & Unfunded Cost | Maint Cost Report Q-D160A-H3A-AX-MH3 | RAF Recov Alloc Factor | Remarks |
|---|---|---|---|---|---|---|---|
| PRC 074 Radio Set | 5820-00-912-3991 | -- | 3153 | 3153 | 3153 | 1 | OK; End Item only |
| TCC 003 Telephone Terminal | 5805-00-503-2648 | 5805-00-503-1285 | 7088 | 7088 | 7088 | 1<br>1 | OK; Only One Subassembly |
| GRN 020A Radio Navaids Set | 5825-00-492-9797 | 5825-00-233-0928 | 1398 | 1498 | 1498 | 1<br>1 | Maint Cost Report $100 Higher than Four-Quarters File; One Subassembly |
| MRN 020 Air Traffic Control Set | 5895-00-600-0743<br>5895-01-087-7820 | 5895-00-984-6259<br>5895-00-984-6258<br>5820-00-892-3725 | 4360 + 3722<br>376<br>3399<br>32842<br>41653<br>41462<br>45119 (172,933; 141,076) | 158,251 | 351<br>3192<br>154708 (158,251) | 1<br>1<br>1<br>1<br>1 | Maint Cost Report and Four-Quarters File not in Synch; Two NSNs and Three Subassemblies |
| FRW 002 Radio Transmitting Set | 5820-00-892-0746<br>5820-00-784-1529 | 5820-00-951-9934<br>5820-00-951-9934<br>5960-00-023-8445<br>5960-00-023-8445 | 489<br>489<br>20160<br>17000 (37,649) | 37,649 | 489<br>489<br>37160 (37,649) | 1<br>1<br>.130<br>.870<br>1 | OK; TMS has Two NSNs and Two Subassemblies |
| FYQ 003 Remote Comm Central Subscriber | 5895-00-887-4822 | 5895-00-952-1671<br>5895-00-717-4930<br>5895-00-717-4930<br>5895-00-408-0039 | 925 + 3475<br>3022<br>5634<br>10631 (18053) | 2054 | 4337<br>8227<br>10096 (22660; 2054+ this col x RAF) | 1<br>.005<br>.247<br>.000 | Maint Cost Report and Four-Quarters File not in Synch, Three Subassemblies |
| FYQ 062 Digital Data Convert Subscriber | 5895-00-091-8712 | 5895-00-071-1896<br>5895-00-952-1671<br>5895-00-952-1671 | 64<br>925<br>3475 (4464) | 72 | 61<br>4337 (72+ this col x RAF) | 1<br>.333<br>.012 | Maint Cost Report and Four-Quarters File not in Synch, Two Subassemblies |

Allocation Factor were selected from the Four-Quarters file or the Depot Maintenance Costs report. The Recoverable Allocation-Factor was assumed to be correctly computed in VAMOSC since input sources for its computation were not available.

Table 2 shows that the depot maintenance costs for PRC074, TCC003 and FRW002 checked out exactly. The cost for GRN020A from the Depot Maintenance Costs report was $100.00 higher than from the Four-Quarters file. The other three TMSs - MRN020, FYQ003, and FYQ062 did not favorably check between the Four-Quarters file and the Depot Maintenance Cost report. Since the Four-Quarters file provides the source of input to the Depot Maintenance Cost report, these costs should be identical. Nearly all of the costs that compared favorably were from TMSs which either had a Recoverable Allocation Factor of one (1), or had only one or two components whose subassemblies added up to a total of one (1) e.g. FRW002. Therefore, the program involving the computation of costs for the Recoverable Allocation Factor requires verification.

3.4.2 CSCS Comparisons by Aircraft and Component

Depot cost information from the Four-Quarters file (H036B system) is a major contributing factor in most of the VAMOSC reports for CSCS. However, as previously mentioned, many of the cost elements of these reports are computed from several other data systems, making it infeasible to manually check all H036B system cost elements through these reports. It was feasible to check several key H036B cost elements through two of the major

CSCS reports, namely, reports RCS HAF-LEY(AR)8104 and RCS HAF-LEY(AR)8111. The results of these cost element comparisons for selected aircraft and NSN components between the Four-Quarters file and the CSCS reports are provided in Table 3 and Table 4 repectively.

Inspection of Table 3 shows that no Class IV or Class V Mod cost elements could be found on the Four-Quarters file for the F111A or the F111D aircraft as a basis of comparison with the 8104 Report. This is an obvious discrepancy since the Four-Quarters file provides the input for the 8104 Report. This discrepancy implies that the H036B Extraction Program is not consistently selecting items properly or that extraneous data is appearing in the 8104 Report. Class V Mod cost elements for the E-3A aircraft checked exactly with the exception of "Other Costs CL V MODS" cost element. With respect to the A-10A aircraft, three of the cost elements "Labor Cost CL V Mods", "Labor Hour CL V Mods", and "Material CL V Mods" checked exactly but "Overhead CL V MOds" and "Other Costs CL V Mods" did not check. Additionally, a cost of $90,800 was reported for the "Other Costs Class IV Mods" on the 8104 Report with no comparable cost reported on the Four-Quarters file.

The purpose of Table 4 was to compare various depot costs for the FY 83 fourth quarter from the CSCS Report 8111 for selected components of selected aircraft with the Four-Quarters file. The cost elements are represented in the columns of Table 4 and the components in the rows. This comparison was not

TABLE 3

Comparison of Four Quarters File and VAMOSC CSCS Report 8104

FY 83 Fourth Quarter MDS Depot TCTO Costs By Aircraft

(CSCS Report Costs, Top row for Each Aircraft in Thousands of Dollars; Four-Quarters File Costs, Bottom Line for Each Aircraft in Dollars)

| MDS | LABOR COST CL IV MODS | LABOR HOURS CL IV MODS | MATERIAL CL IV MODS | OVERHEAD CL IV MODS | OTHER COSTS CL IV MODS | LABOR COST CL V MODS | LABOR HOURS CL V MODS | MATERIAL CL V MODS | OVERHEAD CL V MODS | OTHER COSTS CL V MODS | LABOR COST DEPOT OTHER MODS | LABOR HOURS DEPOT OTHER MODS | MATERIAL DEPOT OTHER MODS | OVERHEAD DEPOT OTHER MODS | OTHER DEPOT MODS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A-10A | - | - | - | - | 90.8<br>- | 1,139.1<br>1,139,067[2] | 73,870[3]<br>73,870[3] | 1,238<br>1,237,956[4] | 260.0<br>Fund UnFund 844233+35863[5] | 1,440.4[1]<br>0[1] | 0 | 0 | 93.7 | 19.7 | 0 |
| E-3A | 0 | 0 | 0 | 0 | 0 | 298.5<br>298,518 | 20,026<br>20,026 | 0<br>16 | 0 | 532.3<br>0 | 0<br>0 | 0 | 0 | 0 | 0 |
| F-111A | 41.7 | 0 | .5 | 0 | 1.0 | 0 | 0 | 0 | 0 | 0 | 16.1 | 1,070 | 212.0 | 44.5 | 23.5 |
| | No Class IV or Class V Mod costs were found by the H036B extract program for F-111A | | | | | | | | | | | | | | |
| F-111D | 42.3 | 0 | 1.2 | 0 | 2.0 | 23.8 | 0 | 4.4 | 0 | 39.0 | 73.9 | 4,928 | 575.3 | 120.8 | 340.0 |
| | No Class IV or Class V Mod Costs were found by the H036B extract program for F-111D | | | | | | | | | | | | | | |



1 Other direct cost funded + Cont/INTER SER/COST + GOVERN FURN SER/Fund + Maint/SUP ORG/UNFUND from Four-Quarters File
2 CIV Prod Direct Labor, CIV Other Dir Labor, MIL Prod Dir Labor, Military Other Direct Labor summed from Four-Quarters File
3 CIV & MIL Direct Labor Man-hours + CIV and MIL Other Man-hours summed for Class V from Four-Quarters File
4 Direct Mat Cost Unfund KIT + Gov Furn Mat/KIT from Four-Quarters File
5 Operation Overhead Funded + Operation Overhead Unfunded summed from Four-Quarters File

TABLE 4

Comparison of Four-Quarters File and VAMOSC Report 8111

FY 83 Fourth Quarter CSCS Items

| | NSN | UNIT PRICE | NSN NOUN | WUC | LABOR HOURS | LABOR COST | DIRECT MATERIAL | OTHER | EXCH REPAIR | EXCH MOD (CL IV) | EXCH MOD (CL V) | MAT MGT OV/HEAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A-10 | 1560-01-009-9301 | 7411.11 | Fuel Tank | 46AEO | | | | | | | | |
| | 1560-01-083-2648 | 3239.00 | Inlet Assmbly | 11F00 | | | | | | | | |
| | 1560-01-090-0539 | | | -- | | | | | | | | |
| | 1560-00-599-1612 | 1599.00 | Door, Access | 11AST | | | | | | | | |
| | 1560-01-050-3484 | 3766.71 | Panel Assembly | 11DQL | | | | | | | | |
| | 1560-01-015-9843 | | | -- | | | | | | | | |
| | 1560-01-040-2925 | 3916.00 | Panel, Lead Edge | 11AEO | | | | | | | | |
| | 1560-01-044-9363 | 3996.00 | Panel Assembly | 11DNH | | | | | | | | |
| | *6110-01-115-3871 | | | -- | | | | | | | | |
| F-111 | 1560-00-411-5028 | 12,557 | Vane Assembly Flap | 14DCJ | | | | | | | | |
| | 1560-00-411-7280 | 43,883 | Fairing, Fuselage | -- | | | | | | | | |
| | 1560-00-451-9977 | 9,380 | Spoiler Assmbly | 14BDB | | | | | | | | |
| | 1560-00-473-1647 | | | -- | | | | | | | | |
| | 1560-00-080-3412 | 61,698 | Rudder, Aircraft | 14ADA | | | | | | | | |
| | 1560-00-098-5134 | 208.70 | Track, Translating | 14DCP | | | | | | | | |
| | 1560-00-101-0066 | 1212.43 | Track, Translating | 14DCP | | | | | | | | |
| | 1560-00-078-6426 | 2999.76 | Seal Assmbly, Fuel | 11BBF | | | | | | | | |
| | 1650-00-011-5591 | 1419.00 | Dampener, Fluid Press | 75ABC | | | | | | | | |
| | *1650-01-147-9102 | | | -- | | | | | | | | |
| E-3A | 6615-01-013-5966 | | | -- | | | | | | | | |
| | 1650-01-183-0211 | | Drive, Constant Speed | -- | | | | | | | | |
| | 6615-01-008-1572 | | | -- | | | | | | | | |
| | 6610-01-010-2018 | | | -- | | | | | | | | |
| | 1660-01-158-2694 | | | -- | | | | | | | | |

No Depot WUC costs computed by SM-ALC for 8111 Report

No WUC costs could be located for these particular WUCs on 8111 Report

No Depot WUC costs computed for ALC OC-ALC for 8111 Report

*Contract Items

possible since no WUC costs could be located on the 8111 Report. In fact, for the A-10 aircraft, a message was printed on the report stating "No Depot WUC costs computed by ALC SM-ALC". A similar message was printed on the 8111 Report for the E-3A aircraft stating "No depot WUC costs computed by ALC OC-ALC". For the F-111 aircraft, minimal WUC costs were printed on the 8111 Report but no costs were available for the particular NSN items selected. This is highly unusual since these items were selected by the ALCs as high visibility items that should have depot costs reported in each FY quarter. It should be noted that even if WUC costs had been computed for the particular items selected for the E-3A aircraft, they would never have been located since there were no WUCS established for NSNs for the E-3A aircraft in the NSN-MDS-WUC Cross-Reference File, RCS HAF-LEY(AR)8109 Report. As indicated also in Table 4, several WUCs were missing in the NSN-MDS-WUC cross reference file for the A-10 and F-111 aircraft.

3.5 Comparison of Four-Quarters File Data with DoD Handbook 7220.29H Report

During the data analysis for this study, it was learned that OSD is currently conducting a comprehensive review of the data sent by all the services as a result of the report required by DoD Handbook 7220.29H. H036B is the Air Force data provided to meet this requirement. As a result, OSD analysts were contacted to determine whether the selected H036B data of this analysis were properly submitted to OSD. This contact was approved by the

Office of VAMOSC, AFLC/MML (VAMOSC). OSD analysts provided FY 83 and FY 84 extracts from the annual submission of Air Force data for this analysis. A high degree of accuracy was found in the consolidation of most records in producing the DoD report from the AFLC Four-Quarters files. However, some FY 84 records from an individual NSN were missing from the DoD data. In some instances all the records for an NSN would be missing. A listing of the missing records for the selected items of this analysis is provided in Attachment H. Since several records were missing within the few selected items examined, it is evident that a large number of items could be missing in the annual submission to DoD. This same condition also occurred in checking FY 83 selected items. It appears that all of the data on the annual H036B file are not being transmitted to OSD. All data are available, however, to VAMOSC processing since VAMOSC uses the Four-Quarters file as input. This circumstance was also reported to the H036B OPR for appropriate action.

The high "Production Count" referred to in Section 3.3 paragraph b. for the J-33-35 engine and the EF-111A aircraft was also evident in the DOD data. This indicates that these obvious production count errors are being transmitted to OSD under the reporting requirement of DoD Handbook 7220.29H.

## 4.0 Conclusions

H036B depot maintenance data are appropriate for VAMOSC purposes. The following issues affect the accuracy of the data and should be addressed as time and resources permit.

(a) Production counts for several of the selected aircraft and engines were not valid for fourth quarter FY 84. The J-33-35 engine production count for overhaul work (WPC=A) was 7200; this compares with an inventory of 350 engines. The EF-111A aircraft production count for analytical rework (WPC=G) was 360; this compares with an inventory of 60-65 aircraft.

(b) Mobile Depot Team costs are reported in H036B system by NSN. These costs are also reported in C003K system by Standard Reporting Designator (SRD). This reporting can create double accounting costs in VAMOSC unless the two feeder systems are mutually exclusive for end items.

(c) Unresolved negative costs for labor and/or material are generating errors in actual depot maintenance cost reporting.

A negative direct material investment cost unfunded (WPC=C) of $241,335 and a negative exchange material cost unfunded (WPC=I) of $491 was indicated on the E-3A aircraft at OC-ALC on the Four-Quarters file for the 4th Quarter FY 84. Also, a negative direct material cost funded (WPC=I) of $429 was indicated on the FB-111A aircraft at SM-ALC on the Four-Quarters file for the 4th Quarter FY 84.

(d) Contractor costs for depot work ordinarily provided by G072D and entered into H036A at the ALCs can be modified by direct card input into H036A. This authorized procedure breaks the audit trail between the regular input sources and the H036A file and can cause difficulty in identification of processing errors.

(e) A printing error exists in the display of H036A costs at the ALCs; this can cause misinterpretation of several of the H036A cost elements.

(f) Maintenance support costs are reported by H073 at the MD and stock class levels vice MDS and stock number level. If costs could be made available at the MDS and NSN level, VAMOSC reporting would be improved.

(g) The "Average Cost of Repair" computation for Owner/Operator Code 3 (Contractor Work) on the H036A file from SM-ALC was erroneous by a factor of 10. This computation does not affect VAMOSC costs since VAMOSC computes its own average cost of repair. Uses of this cost element for cost estimating would be impacted, however, if applied at the ALCs.

(h) No internal intermediate level reports are provided by VAMOSC that display results of intermediate processing computations, i.e. "Average Cost to Repair". This void makes it difficult to track and verify output cost elements.

(i) The H036B file provided to DoD in compliance with DoD Handbook 7220.29H does not contain the same number of records

displayed in the AFLC Four-Quarters file. This situation can cause difficulty at OSD when comparing costs provided by HO36B to other information sources.

(j) Comparison of the Four-Quarters file with the VAMOSC C-E report for C-E end items for FY 83 showed several discrepancies. There appears to be an error in the extraction of all associated subassembly costs from the Four-Quarters file for certain end items, e.g. FYQØØ3 and FYQØ62 and/or errors in the application of the Recoverable Allocation Factor.

(k) The HO36B Extraction Program was unable to locate Class IV and Class V Modifications from the Four - Quarters file for the F-111A and F-111D aircraft. This made it impossible to check TCTO costs on the CSCS 8104 Report for these aircraft.

(l) Discrepancies were found between the Four-Quarters file and the CSCS 8104 Report in the comparison of "Overhead Class V Mods" and "Other Costs Class V Mods" for the A-10A and E-3A aircraft.

(m) The NSN-MDS-WUC Cross Reference file is incomplete for many NSNs, making it impossible to verify the RCS-HAF-LEY (AR) 8111 Report for many CSCS components.

(n) No WUC costs for CSCS components were computed for the 8111 Report associated with the A-10 or E-3A aircraft. Additionally, no computed WUC costs could be located for selected CSCS components on the F-111 aircraft.

## 5.0 Recommendations

H036B should continue to be the data source for depot maintenance costs for VAMOSC system. To enhance accuracy and complete reporting, consideration should be given to the following:

(a) Program control should be established to screen production counts so that they do not exceed maximum numbers of end items. Definitions of production counts for all WPCs should be reviewed to see that production counts represent the appropriate end item.

(b) Review reporting of Mobile Depot Team data by H036B and C003K and select the most accurate system to provide input to VAMOSC.

(c) Establish a procedure for adjustment and accounting of negative costs that are reported for previously completed job orders. These adjustments should be made in AFLC and OSD records so as to continually update historical files.

(d) Review procedures which authorize adjustments to G072D contractor costs by card input into H036A; establish system for accounting of these costs.

(e) Correct the printout program of H036A, which provides the file dump, to adjust for an erroneous NSN line display.

(f) Examine the procedure for recording maintenance support costs in H073 at the MD and stock class level; determine the

feasibility of providing maintenance support costs at the MDS and stock number level.

(g) Correct computation of "Average Cost of Repair" for Owner/Operator Code 3 (contractor work) on the H036A file for SM-ALC.

(h) AFLC/MML (VAMOSC) should develop intermediate reports to assist in verification of reported VAMOSC costs. For example, such computations as "Average Cost of Repair" by NSN and engine TMS would provide assistance in establishing the accuracy of CSCS costs and output reports and responding to user queries regarding accuracy of data.

(i) Review and correct current computer program that extracts and/or combines H036B system data into the annual report to OSD. Assure that the program selects all records.

(j) Check the computation and application of the Recoverable Allocation Factor in producing depot maintenance costs for C-E end items.

(k) Verify the accuracy of the H036B Extraction Program in selecting Class IV and Class V Mods for selected aircraft.

(l) Determine the reason for discrepancies found in "Overhead Class, IV and V Mods" and "Other costs Class IV and V Mods" for the A-10A and E-3A aircraft between the Four-Quarters file and the CSCS 81C Report.

(m) Request ALCs to expedite completion of the NSN-MDS-WUC Cross Reference File.

(n) Determine the reason for WUC costs not being available for the A-10 and E-3A aircraft in order to complete requirements for the CSCS 8111 Report. Based on selected data, it is assumed that WUC costs have not been computed for other aircraft.

ATTACHMENT A

REFERENCES

ATTACHMENT A

References


1. DoD 7220.29H; Depot Maintenance and Maintenance Support Cost Accounting and Production Reporting Handbook.

2. AF Regulation 400-31 Volume I 30 Sept 82; Visibility and Management of Operating and Support Cost Program, Policy and Procedures.

3. AF Regulation 400-31 Volume II 24 Aug 82, Visibility and Management of Operating and Support Cost Program, Weapon Systems Support Costs (WSSC).

4. AF Regulation 400-31 Volume III, 12 Aug 82, Visibility and Management of Operating and Support Cost Program, Ground Communications-Electronics (C-E).

5. AF Regulation 400-31, Vol IV 6 Aug 82, Visibility and Management of Operating and Support Cost Program (VAMOSC), Component Support Cost System (CSCS).

6. AFLC Manual 173-264 3 Oct 83, Cost Analysis, Weapon System Cost Retrieval System (WSCRS) - (H036C).

7. AFLC Manual 171-226, 9 Oct 81, Depot Maintenance Industrial Fund (DMIF) Cost Accounting and Prodution Report (CAPR) - ALC (H036A/GW).

8. AFLC Manual 171-108, 14 Mar 84, Depot Maintenance Industrial Fund (DMIF) Cost Accounting and Production Report (CAPR) - AFLC (H036B/AH).

9. Depot Maintenance Automated Data Systems, Directorate of Maintenance Warner Robins Air Logistics Center, Robins Air Force Base, Georgia.

10. AFLC Memorandum Number: H036B D160A-A Memorandum of Agreement For System Interfaces (C-E) Jan 81.

11. AFLC Memorandum Number: H036B/D160-A Memorandum of Agreement for System Interface (CSCS) 5 Mar 84.

12. AFLC Memorandum Number: H036C/D160-C Memorandum of Agreement for System Interfaces (WSSC) 19 Apr 83.

ATTACHMENT A

References (Cont'd)

13. Memorandum Number: G072A/H036A-A Memorandum of Agreement 19 Mar 80.

14. Memorandum Number: G072D/H036A-A Memorandum of Agreement 4 Oct 82.

15. Memorandum Number H073/H036A - 76197-A (Undated).

ATTACHMENT B

TERMS AND ABBREVIATIONS

ATTACHMENT B

## Terms and Abbreviations

| | | |
|---|---|---|
| AFIF | - | Air Force Industrial Fund |
| AFLC | - | Air Force Logistics Command |
| ALC | - | Air Logistics Center (Depot) |
| AVISURS | - | Aerospace Vehicle Inventory Status Utilization Reporting System |
| BDN | - | Bulk Data Network |
| BOM | - | Bill of Material |
| CEMS | - | Comprehensive Engine Management System |
| CFE | - | Contractor Furnished Equipment |
| DMIF | - | Depot Maintenance Industrial Fund |
| DMS | - | Depot Maintenance Service |
| DOIH | - | Do In From Overhaul |
| DPAH | - | Direct Product Actual Hours by Work Center |
| DPEH | - | Direct Product Earned Hours (Production Count by Job Order No.) |
| EEI | - | Essential Element of Information |
| ERRC | - | Expendibility, Recoverability, Repairability Category |
| FSC | - | Federal Supply Class |
| GFE | - | Government Furnished Equipment |
| GOGO | - | Government Owned, Government Operated |
| I&S | - | Interchangeable and Substitutable |
| IPB | - | Illustrated Parts Breakdowns |
| LRU | - | Line Replaceable Unit |
| MASDC | - | Military Aircraft Storage and Disposition Center (At Davis - Monthan Air Force Base) |
| MAW | - | Maintenance Workloading Division (Organization) |
| MDC | - | Maintenance Data Collection |

Terms and Abbreviations (Cont'd)

| | | |
|---|---|---|
| MDM | - | Mobile Depot Maintenance |
| MDS | - | Mission, Design, Series |
| MIC | - | Maintenance Inventory Center |
| MISTR | - | Management of Items Subject To Repair |
| MMAC | - | Medical, Material, Advice Code |
| MMC | - | Material Management Code |
| MMICS | - | Maintenance Management Information and Control System |
| MTBM | - | Mean Time Between Maintenance |
| NHA | - | Next Higher Assembly |
| NRTS | - | Not Repairable This Station |
| NSN | - | National Stock Number |
| OPR | - | Office of Primary Responsibility |
| OWO | - | On-Work Order |
| PCN | - | Program Control Number |
| PCS | - | Permanent Change of Station |
| PDM | - | Programmed Depot Maintenance (Total A/C) |
| RCC | - | Resource Control Center |
| RC/CC | - | Responsibility Center/Cost Center |
| RCM | - | Reliability Centered Maintenance |
| RCS | - | Reports Control Symbol |
| RTS | - | Repairable This Station |
| SRAN | - | Stock Record Account Number (Indentifies Base) |
| SRD | - | Standard Reporting Designator |
| SRU | - | Shop Replaceable Unit |
| *TCTO | - | Time Compliance Technical Order (modification) |

Terms and Abbreviations (Cont'd)

| | | |
|---|---|---|
| TMS | - | Type, Model, Series |
| VAMOSC | - | Visibility and Management of Operating and Support Costs |
| WAC | - | Work Accomplishment Code (A-overhaul; I-repair) |
| WBS | - | Work Breakdown Structure |
| WPC | - | Work Preformance Category |
| WSC | - | Weapon System Code |
| WUC | - | Work Unit Code |

*TCTO - General modification, either Class IV or V done at base or depot. Base or Depot Exchangable modification is on components that are sent to depot for modification. Depot uses D033 for quantity issued vice G004L or G019F for quantity issued vice #NRTS.

ATTACHMENT C

COST ELEMENTS FOR HO36A AND FOUR-QUARTERS FILE

ATTACHMENT C

Cost Elements for H036A and Four-Quarters File

1. Quarter Code
2. Fiscal Year
3. Program Element Code
4. Facility Name
5. Area Code (Inside/Outside U.S.)
6. Owner/Operator Code
7. Reporting Facility Code
8. Item Identification
9. Item Nomenclature
10. Standard Inventory Price
11. Weapon System Support Code
12. Work Breakdown Structure Code
13. Work Performance Category
14. Customer Code
15. Direct Civilian Labor Production Cost
16. Direct Civilian Labor Production Hours
17. Direct Civilian Labor Other Cost
18. Direct Civilian Labor Other Hours
19. Direct Military Labor Production Cost
20. Direct Military Labor Production Hours
21. Direct Military Labor Other Cost
22. Direct Military Labor Other Hours
23. Direct Material Cost Funded
24. Direct Material Investment Cost Unfunded
25. Direct Material Exchange Cost Unfunded
26. Direct Material Modification Kits Cost Unfunded
27. Direct Material Expense Cost Unfunded
28. Other Direct Cost Funded
29. Other Direct Cost Unfunded
30. Operations Overhead Funded
31. Operations Overhead Unfunded
32. General and Administrative Expense Funded
33. General and Administrative Expense Unfunded
34. Contract or Interservice Cost
35. Government Furnished Material Investment Cost
36. Government Furnished Material Exchange Cost
37. Government Furnished Material Modification Kit Cost
38. Government Furnished Material Expense Cost
39. Government Furnished Services Cost funded
40. Government Furnished Services Cost Unfunded
41. Maintenance Support Cost, Organic Funded

ATTACHMENT C

Cost Elements for HO36A and Four-Quarters File (Cont'd)

42. Maintenance Support Cost Organic Unfunded
43. Total Production Quantity Completed
44. Quantity Completed Reporting Year
45. Quantity Completed Prior Year
46. Quantity Completed All Prior Years
47. Work Days in Process
48. Job Order Number Classification Code
49. Total Cost Funded
50. Total Cost Unfunded
51. Average Unit Repair Cost
52. Program Control Number
53. Production Status Code
54. Material Management Code
55. Weapon System Support Code
56. Work Breakdown Structure Code
57. Job Order Number Control

ATTACHMENT D

END ITEM AND COMPONENT SELECTION

ATTACHMENT D

End Item and Component Selection

C-E Items (SM-ALC)

| | NSN | ITEM | TMS |
|---|---|---|---|
| ORGANIC: | 5815-00-942-5582 | ZX/Teleprinter/FFR-76 | |
| : | 5820-01-065-1679 | /X-96 MULTIPLIER/TRC-97A | |
| : | 5820-01-067-4865 | /Receiver/FRR-98 | |
| CONTRACT: | 5960-00-809-1867 | ZX/Klystron Tube/FRC-39 PN:4KM50, 000LR | |

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| | NSN | ITEM | TMS |
|---|---|---|---|
| ORGANIC: | 5895-00-150-8707 | ZK/Transmitter/TPX-42A | |
| : | 5895-00-871-8172 | ZK/Deflection AMP/TPN-19 | |
| : | 5895-01-149-7624 | ZK/Power Supply/TPN-19 | |
| : | 5895-01-061-9976 | ZU/Target Data Computer/GPN-22 | |
| : | 5825-01-046-8612 | /Recoverable Assembly/GRN-29 | |
| : | 5840-00-162-1231 | ZR/SF-6 Tank/TPS-43E | |
| CONTRACT: | 5840-01-051-3036 | /OCA Modem/ GPN-24 Contract #: F04606-82C-0717;P/N 0303031-1 | |

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| | NSN | ITEM | TMS |
|---|---|---|---|
| ORGANIC: | 5840-00-505-0921 | Radar/FPS006 | |
| : | 5805-00-440-6029 | Carrier Multiplex/45BX3263 | |
| : | 5805-00-440-6030 | Carrier Multiplex/45BX3263 | |
| : | 5805-00-440-6031 | Carrier Multiplex/45BX3263 | |
| : | 5805-00-440-6032 | Carrier Multiplex/45BX3263 | |

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CSCS Items (SM-ALC)

A-10 Aircraft

| | NSN | ITEM | JO | WORK CENTER |
|---|---|---|---|---|
| ORGANIC: | 1560-01-009-9301 FJ | Fuel Tank | 37566A | MAN PA9C |
| : | 1560-01-083-2648 FJ | Engine Inlet | 28874A | MAN PA9D |
| : | 1560-01-090-0539 FJ | Slat Asst | 36262A | MAN PA9D |
| : | 1560-00-599-1612 FJ | Access D005 | 36394A | MAN PF9G |
| : | 1560-01-050-3484 FJ | Panel Assy | 37388A | MAN PF9G |
| : | 1560-01-015-9843 FJ | Shroud Assy | 39386A | MAN PA9D |
| : | 1560-01-040-2925 FJ | Panel Assy | 36183A | MAN PF9G |
| : | 1560-01-044-9363 FJ | Panel Assy | 36184A | MAN PF9G |
| CONTRACT: | 6110-01-115-3871 | Electronic Computer Unit | | |

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CSCS Items (SM-ALC)

F-111 Aircraft

| | NSN | ITEM | JO | WORK CENTER |
|---|---|---|---|---|
| ORGANIC: | 1560-00-411-5028BJ | Van Assy Flap | 10908A | MAN PF98 |
| : | 1560-00-411-7280BJ | Over Wing Fairing | 36362A | MAN PF9C |
| : | 1560-00-451-9977BJ | Spoiler Assy | 20130A | MAN 9F9H |
| : | 1560-00-473-1647BJ | Spoiler Assy | 26096A | MAN 9F9H |
| : | 1560-00-080-3412BJ | Rudder | 34025A | MAN PF9J |
| : | 1560-00-098-5134BJ | Track | 16222A | MAN PE9T |
| : | 1560-00-101-0066 | | 16103A | MAN PE9T |
| : | 1560-00-078-6426 | Drag Link Seal | 48104A | MAC PR9B |
| : | 1650-00-011-5591 | Dapener Assy | 45997A | MAC PS9C |
| CONTRACT: | 1650-01-147-9102BJ | Horizontal Stabilizer Valve | | |

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ATTACHMENT D

End Item and Component Selection (Cont'd)

CSCS Items (OC-ALC)

E-3A Aircraft

| NSN | ITEM | WUC |
|---|---|---|
| 6615-01-013-5966 | Amplifier Computer | 52AQO |
| 1650-01-183-0211 | Constant Speed Drive | 42ATA |
| 6615-01-008-1572 | Parallel Coupler | 52BBO |
| 6610-01-010-2018 | Central Air Data Computer (CADC) | 51EAO |
| 1660-01-158-2694 | Fire Wall Shut-Off Valve | 41ACO |

Aircraft Engines (OC-ALC)

J-57-21B
J-57-43WB
TF-30-7
TF-30-100
J-33-35

ATTACHMENT E

COST ELEMENTS - GO72A

ATTACHMENT E

Cost Elements - G072A

1. Quarter Code
2. Fiscal Year
3. Reporting Facility Code
4. Owner/Operator Code
5. Job Order
6. Item Identification
7. Program Control Number
8. Job Order Number Class
9. Direct Civilian Labor Production Cost
10. Direct Civilian Labor Production Hours
11. Direct Civilian Labor Other Cost
12. Direct Military Labor Production Cost
13. Direct Military Labor Production Hours
14. Direct Military Labor Other Cost
15. Direct Material Cost Funded
16. Direct Material Investment Cost Unfunded
17. Direct Material Exchanges Cost Unfunded
18. Direct Material Modification Kits Cost Unfunded
19. Direct Material Expense Cost Unfunded
20. Other Direct Cost Funded
21. Other Direct Cost Unfunded
22. Operations Overhead Funded
23. Operations Overhead Unfunded
24. Operations Overhead STD Funded
25. General and Administrative Expense Funded
26. General and Administrative Expense Unfunded
27. General and Administrative Expense STD Funded
28. Production Total (Job Order Quantity)
29. Quantity Completed Reporting Year
30. Quantity Completed Prior Year
31. Quantity Completed Previous Years
32. Work Days in Process
33. Production Status Code

ATTACHMENT F

COST ELEMENTS - GO72D

ATTACHMENT F

Cost Elements - G072D

1. Quarter Code
2. Fiscal Year
3. Reporting Facility Code
4. Owner/Operator Code
5. Item Identification
6. Work Performance Category (WPC)
7. Reimbursement Code
8. Facility Name
9. Contract Cost
10. Government Furnished Material Investment Cost
11. Government Furnished Material Exchangeable Cost
12. Government Furnished Material Modification Cost
13. Government Furnished Material Expense Cost
14. Government Furnished Services Funded Cost
15. Government Furnished Services Unfunded Cost
16. Total Production
17. Quantity Completed Reporting Year
18. Quantity Completed Prior Year
19. Quantity Completed Previous Years
20. Contract Number

ATTACHMENT G

COST ELEMENTS - H073

ATTACHMENT G

Cost Elements - H073

1. Quarter Code
2. Fiscal Year
3. Reporting Facility
4. Item Identification
5. Work Performance Category (WPC)
6. Unfunded Cost

ATTACHMENT H

DOD HANDBOOK 7220.29H FY 84 AIR FORCE
DATA DISCREPANCIES

ATTACHMENT H

## DoD Handbook 7220.29H FY 84 Air Force Data Discrepancies

The following stock numbered item records were missing from the FY 84 Air Force data for selected items of this study, submitted in conformance with DoD 7220.29H Report. The missing items were available on the AFLC Four-Quarters file which furnishes the DoD 7220.29H information.

| | | |
|---|---|---|
| 1. | 1560-01-009-9301 | Missing a WPC=A record |
| 2. | 1560-01-040-2925 | Missing two WPC=A records |
| 3. | 1560-01-083-2648 | Missing one WPC=G record |
| 4. | 1560-01-090-0539 | Missing one WPC=A record |
| 5. | 1650-00-011-5591 | Missing one WPC=G record |
| 6. | 5815-00-942-5582 | Missing three WPC=A records<br>Missing four WPC=G records |
| 7. | 5820-01-065-1679 | Missing one WPC=G record |
| 8. | 5820-01-067-4865 | Missing four WPC=G records |
| 9. | 5825-01-046-8612 | Missing four WPC=A records (all item records missing) |
| 10. | 5895-00-150-8707 | Missing three WPC=G records |
| 11. | 5895-01-061-9976 | Missing two WPC=A records (all item records missing) |
| 12. | 5895-01-149-7624 | Missing one WPC=A record and two WPC=G records |
| 13. | 6610-01-010-2018 | Missing one WPC=A record |
| 14. | 6615-01-008-1572 | Missing three WPC=A records (all item records missing) |
| 15. | 6615-01-013-5966 | Missing three WPC=G records |

ATTACHMENT H

DoD Handbook 7220.29H FY 84 Air Force
Data Discrepancies (Cont'd)

16. 1560-00-599-1612 Missing four WPC=A records (all item records missing)

17. 1560-01-050-3484 Missing one WPC=A record (all item records missing)

18. 1560-00-098-5134 Missing four WPC=A records

19. 1560-00-101-0066 Missing four WPC=A records (all item records missing)

The following stock numbered items (C-E items only) were missing from the DoD 7220.29H report for FY 83 that was recently supplied (dated 4/4/85) to ISI for C-E selected items. The missing items were available on the AFLC Four-Quarters file for FY 83 which provides the DOD 7220.29H information and should have appeared on the DoD report.

| | |
|---|---|
| 5815-00-942-5582 | WPC=G Printout missing |
| 5820-01-065-1679 | WPC=G Printout missing |
| 5820-01-067-4865 | WPC=G Printout missing |
| *5825-01-046-8612 | WPC=A Printout missing |
| 5895-00-150-8707 | WPC=G Printout missing |

*This whole record was missing.

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

# REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

| | |
|---|---|
| 1. REPORT NUMBER | 2. GOVT ACCESSION NO |
| 3. RECIPIENT'S CATALOG NUMBER | |
| 4. TITLE (and Subtitle) Phase II Verification Report of VAMOSC Source Data System H036B | 5. TYPE OF REPORT & PERIOD COVERED Technical Report |
| | 6. PERFORMING ORG. REPORT NUMBER |
| 7. AUTHOR(s) Donald O. Larson | 8. CONTRACT OR GRANT NUMBER(s) F33600-84-C-0465 |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS Information Spectrum, Inc. 1745 Jefferson Davis Highway Arlington, Virginia 22202 | 10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS |
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Depot Maintenance Industrial Fund Cost Accounting Production Report (H036B)
VAMOSC
O&S Cost Model
H036B Verification Report

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report presents an analysis and results of the verification of data provided by the Depot Maintenance Industrial Fund Cost Accounting Production report (H036B). Analysis includes verification of inputs to H036B and checking accuracy of H036B interface with the "Visibility and Management of Operating and Support Costs" (VAMOSC). The recommendation is that H036B should continue to be the data source for depot maintenance costs for VAMOSC system.

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